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**Please find below and/or attached an Office communication concerning this application or proceeding.**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/706,645  
Filing Date: November 12, 2003  
Appellant(s): RAPIER ET AL.

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Beatrice C. Ortego  
For Appellant

**SUPPLEMENTAL EXAMINER'S ANSWER**

This is in response to the Order Returning Undocketed Appeal to Examiner filed March 4, 2009 citing deficiencies in the Examiner's Answer filed December 27, 2007 in response to Appeal Brief filed 9/27/08 appealing from the Office Action mailed 11/28/06.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,015,285	McCarty	1-2000
6,830,596	Deckman	12-2004
4,906,176	Yamashita	3-1990
4,793,797	Kato	12-1988

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 3-7, 9-11, 13-17, 19-25 are rejected under 35 U.S.C. 103 as being anticipated by McCarty et al. (U.S. 6015285) in view of Deckman et al. (U.S. 6830596) and Yamashita et al. (U.S. 4906176).

McCarty et al. teach a support (col. 3, lines 25-28) wherein the support comprises lanthanum oxide hexa-aluminate (col. 3, lines 26-30) and lanthanum oxide alumina hexa-aluminate (meets the limitation wherein hexa-aluminate and alpha-alumina or theta-alumina comprises a support, col. 3, lines 28-31) wherein barrier layer comprises  $\text{La}_2\text{O}_3 \cdot 11\text{Al}_2\text{O}_3$  hexa-aluminate (ratio of aluminum to rare earth is 11:1, meets the limitation wherein the catalyst support comprises between about 1 wt% and about 10 wt% of lanthanum, col. 12, lines 35-38) and wherein alpha alumina comprises the barrier layer (col. 12, lines 30-35) and has a perovskite structure (col. 5, lines 1-29) and wherein the surface area of the support is approximately  $50 \text{ m}^2/\text{g}$  and calcination temperatures of  $1150^\circ\text{C}$  (col. 9, lines 40-48) and wherein gamma-alumina is a precursor (col. 8, line 65-col. 9, line 5) and wherein palladium is a catalyst (col. 3, lines 30-33).

As to the limitation of the support comprising perovskite and hexaaluminate, Deckman teaches that it is known for supports to be combinations of perovskite, hexaaluminate, and stabilized alumina (col. 6, lines 24-37).

Therefore, it would have been obvious to one of ordinary skill in the art to provide a support comprising a hexaaluminate and a perovskite structure in McCarty because McCarty teaches these supports individually and it is known in the art to combine perovskites and hexaaluminates in supports (col. 6, lines 24-37) as taught by Deckman.

Regarding the limitation wherein the catalyst support contains not more than 20% of alpha alumina, Yamashita et al. teach a support such that alpha-alumina is mixed with a lanthanum-stabilized alumina in an amount of 5-30% by weight (col. 7, lines 15-20).

Therefore, it would have been obvious to one of ordinary skill in the art to provide a support comprising alpha-alumina mixed with a lanthanum-stabilized alumina in an amount of 5-30% by weight (col. 7, lines 15-20) in McCarty because it is well known to do so in a substantially high temperature similar support as taught by Yamashita et al.

It is noted that in the final rejection of record, the heading was mislabeled 35 U.S.C. 102(b). It is clear from the record and applicant understood this ground of rejection to be 35 U.S.C. 103. Therefore, the heading has been changed to 35 U.S.C. 103 for the purpose of clarification.

Claims 2, 8, 18, 40-49, 76-77, 80-81, and 83-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCarty et al. (U.S. 6015285) in view of Deckman et al. (U.S. 6830596) and Yamashita et al. (U.S. 4906176).

McCarty et al. teach a support (col. 3, lines 25-28) wherein the support comprises lanthanum oxide hexa-aluminate (col. 3, lines 26-30) and lanthanum oxide alumina hexa-aluminate (meets the limitation wherein hexa-aluminate and alpha-alumina or theta-alumina comprises a support, col. 3, lines 28-31) wherein barrier layer comprises  $\text{La}_2\text{O}_3 \cdot 11\text{Al}_2\text{O}_3$  hexa-aluminate (ratio of aluminum to rare earth is 11:1, meets the limitation wherein the catalyst support comprises between about 1 wt% and about

10 wt% of lanthanum, col. 12, lines 35-38) and wherein alpha alumina comprises the barrier layer (col. 12, lines 30-35) and has a perovskite structure (col. 5, lines 1-29) and wherein the surface area of the support is approximately 50 m<sup>2</sup>/g and calcination temperatures of 1150°C (col. 9, lines 40-48) and wherein gamma-alumina is a precursor (col. 8, line 65-col. 9, line 5) and wherein palladium is a catalyst (col. 3, lines 30-33).

As to the limitation of the support comprising perovskite and hexaaluminate, Deckman teaches that it is known for supports to be combinations of perovskite, hexaaluminate, and stabilized alumina (col. 6, lines 24-37).

Therefore, it would have been obvious to one of ordinary skill in the art to provide a support comprising a hexaaluminate and a perovskite structure in McCarty because McCarty teaches these supports individually and it is known in the art to combine perovskites and hexaaluminates in supports (col. 6, lines 24-37) as taught by Deckman.

Regarding the limitation wherein the catalyst support contains not more than 20% of alpha alumina, Yamashita et al. teach a support such that alpha-alumina is mixed with a lanthanum-stabilized alumina in an amount of 5-30% by weight (col. 7, lines 15-20).

McCarty fails to teach the claimed percentage by weight of the rare earth aluminate with high molar ratio of aluminum to rare earth, the rare earth aluminate with high molar ratio and the alumina phase are intimately mixed, claimed surface area, an active ingredient of the catalyst comprising rhodium or an alloy thereof.

As to the limitation of the claimed percentage by weight of the rare earth aluminate with high molar ratio of aluminum to rare earth, Yamashita et al. teach a support comprising the composite oxide (alumina and a rare earth) present in an amount of from 15 to 95% by weight of the support (col. 5, lines 6-12).

Therefore, it would have been obvious to one of ordinary skill in the art to provide a support comprising the composite oxide (alumina and a rare earth) present in an amount of from 15 to 95% by weight of the support (col. 5, lines 6-12) in McCarty because it is well known to do so in a substantially similar high temperature support as taught by Yamashita et al.

As to the limitation of claimed surface area, Yamashita et al. teach a support wherein the support has a surface area of from 20 to 100 m<sup>2</sup>/g (col. 5, lines 4-6).

Therefore, it would have been obvious to one of ordinary skill to provide a support having a surface area of from 20 to 100 m<sup>2</sup>/g (col. 5, lines 4-6) in McCarty because it is well known to do so in a substantially similar high temperature support as taught by Yamashita et al.

As to the limitation of the rare earth aluminate with high molar ratio and the alumina phase are intimately mixed, Yamashita et al. teach an intimate mixing of aluminum and lanthanum (col. 7, lines 35-38).

Therefore, it would have been obvious to one of ordinary skill to provide a rare earth aluminate (containing lanthanum) and alumina phase intimately mixed in McCarty because it is well known to mix a rare earth with an alumina (col. 7, lines 35-38) in a substantially similar high temperature support as taught by Yamashita et al.



As to the limitation of an active ingredient of the catalyst comprising rhodium or an alloy thereof, Yamashita et al. teach a catalyst structure comprising 1.5 wt.% of platinum and 0.4 wt.% of rhodium (col. 13, lines 27-33).

Therefore, it would have been obvious to one of ordinary skill in the art to provide a catalyst comprising 1.5 wt.% of platinum and 0.4 wt.% of rhodium (col. 13, lines 27-33) because it is well known to do so in a substantially similar high temperature support as taught by Yamashita et al. The prior art range (0.4 wt.% of rhodium) is so close (claimed range 0.5-10 wt.% of rhodium) that one skilled in the art would have expected it to have the same properties. *Titanium Metals Corp. v. Banner*, 227 USPQ 773.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCarty et al. (U.S. 6015285) in view of Deckman et al. (U.S. 6830596) and Yamashita et al. (U.S. 4906176) and Kato et al. (U.S. 4793797).

McCarty teach a support as described above in claim 1. McCarty fail to teach wherein the rare earth aluminate has a chemical formula of  $MAI_yO_z$ , where y is between 11 and 12; z is between 18 and 19; and M comprises a combination of lanthanum and samarium.

Kato et al., however, teach a heat resistant carrier (support, col. 2, lines 55-58) wherein lanthanum and samarium are included in a beta-alumina support (col. 16, lines 30-35) for the purpose of employing multiple rare-earth metals in a known carrier comprising beta-alumina.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein lanthanum and samarium are included in a beta-alumina support (col. 16, lines 30-35) in McCarty in order to employ multiple rare-earth metals in a known carrier comprising beta-alumina as taught by Kato et al.

#### **(10) Response to Argument**

Applicant argues that McCarty solely teaches individual use of stabilized gamma-alumina, lanthanum hexa-aluminate or some substituted lanthanum aluminate composites as the support, but fails to teach the presence of alpha-alumina and/or theta-alumina in combination with a lanthanum hexa-aluminate in a common support.

However, McCarty is not relied upon to teach the presence of alpha-alumina and/or theta-alumina in combination with a lanthanum hexa-aluminate in a common support. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that contrary to what the Examiner stated, alpha-alumina does not have a perovskite structure.

However, the portion in the rejection that applicant is pointing to recites that the rare earth aluminate has a perovskite structure per claim 1.

Applicant argues that Deckman describes separate supports and not supports having a combination of the specific materials therein and that an artisan reading Deckman would not be taught that the support material in Deckman may comprise the combination of alumina, a rare earth hexa-aluminate and a rare earth aluminate perovskite.

However, Deckman teaches that suitable membrane materials are combinations of alumina, perovskites, and hexa-aluminate (col. 3, lines 50-55) wherein the membrane materials comprise a support in which catalysts are deposited thereon (col. 3, lines 5-16). Therefore, it appears that Deckman teaches the combination of alumina, hexa-aluminates and perovskites.

Applicant argues that the expression "or combinations thereof" refer to a list of elements which precede it.

However, in the instant case, the phrase "or combinations thereof" is followed by the phrase "including for example." Therefore, one reading this disclosure would recognize that the former phrase "or combinations thereof" would be applicable to the materials also described thereafter, not only the ones preceding it.

Applicant then argues that the disclosure at column four of Deckman further emphasizes applicant's perspective that the perovskite, hexa-aluminate, and alumina are disclosed singularly rather than in combination.

However, this is merely a preferred embodiment and does not change the disclosure of column three.

Applicant argues that neither *McCarty* nor *Deckman* suggest that the rare earth hexa-aluminate and the alumina phase can be intimately mixed in the support.

However, neither *McCarty* nor *Deckman* are relied upon to teach that the rare earth hexa-aluminate and the alumina phase can be intimately mixed in the support. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that neither *McCarty* nor *Deckman* teach nor suggest that the support may further comprise a rare earth oxide.

However, *Deckman* teaches that the support can comprise lanthanum oxide (col. 3, lines 50-55).

Applicant argues that *Yamashita* was not relied upon to teach the combination of three materials in the support and therefore *Yamashita* cannot be relied upon to remedy the deficiency of the combination of *McCarty* with *Deckman*.

However, *Yamashita* is not relied upon to teach the combination of three materials in the support. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642

F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that because McCarty teaches that it is non-trivial to formulate combustion catalysts and teaches away from changing formulation without risking many failed attempts, it is non-obvious to combine McCarty's disclosure with that of Deckman.

However, both McCarty and Deckman are drawn to catalytic structures. As recited in the rejection, McCarty teaches the individual materials in a support. Deckman teaches that the materials can be combined in a support. Despite the teaching in McCarty that formulating combustion catalysts is difficult, Deckman provides the teaching of combining the three materials. The teaching of McCarty is not a teaching away of the invention, but rather as a caution that is overcome in the disclosure of a catalytic structure comprising alumina, hexa-aluminate, and a perovskite as taught by Deckman.

Applicant argues that there is no motivation to include alpha-alumina in the support of McCarty.

However, McCarty does propose that alumina can be a candidate for a support material (col. 5, lines 1-29). A person of ordinary skill in the art would recognize that alpha-alumina is added to the support to provide for dispersion of the catalyst based on the desired properties of the end product. This reasoning does not teach away from McCarty because although alpha-alumina is used in the barrier layer, one would look to

the desired properties of the end product and in the instant case it is well known to use alpha alumina in a catalytic support to aid with catalytic dispersion.

Applicant argues that the teaching in Yamashita of poor performance of a catalyst disposed on an alpha-alumina teaches away from the current invention.

However, the support in Yamashita only comprises alpha-alumina and not a rare earth aluminate and hexa-aluminate as disclosed in the invention. One of ordinary skill in the art would recognize that the addition of rare earth aluminate and hexa-aluminate would change the properties of the support, and would not interpret the teachings of Yamashita as teaching away from the current invention as the disclosure of Yamashita does not teach a support of alpha-alumina, hexa-aluminate, and a rare earth aluminate.

Applicant argues that none of the references disclose iridium or ruthenium in the active ingredient of the combustion catalyst.

However, claim 40 does not require that iridium or ruthenium be present as the active ingredient of the combustion catalyst. It is only required that the metal is selected from the group consisting of rhodium, iridium, and ruthenium.

Applicant argues that for claims 40, 85, 86, and 89, the artisan would have to remove palladium from the catalyst composition disclosed by Yamashita to arrive to the claimed catalyst, since Pd is not required in these claims.

However, Pd is not excluded from the claims as the claim uses open-type comprising language. Therefore, the disclosure in Yamashita does not teach away from the claimed catalyst composition.

Applicant argues the Group II claims are drawn to partial oxidation catalysts and that none of the references disclose catalysts suitable for a partial oxidation reaction as recited in claims of Group II.

However, the claims are drawn to a product, namely a catalyst composition. The recitation of the catalyst being a partial oxidation catalyst is interpreted as being an intended use recitation. It appears that the prior art of record teaches a substantially similar product as that of the claimed invention such that the properties of the product of the prior art are substantially similar to those of the claimed invention including being capable of being used as a partial oxidation catalyst.

Applicant argues that there is no motivation for combining Yamashita with McCarty to arrive to an effective catalytic partial oxidation catalyst due to the general unpredictability in the chemical arts.

However, the claimed invention is drawn to a catalyst structure. Both Yamashita and McCarty are drawn to combustion catalysts. Applicant admits that McCarty is drawn to a combustion catalyst for natural gas and that Yamashita teaches a catalyst composition for the combustion of hydrocarbons. Therefore, there is sufficient motivation to combine the disclosure of McCarty with that of Yamashita. It appears that applicant is arguing that because the motivation to combine McCarty and Yamashita is

different from that of the claimed invention, the claimed invention is non-obvious. In response to applicant's argument that the motivation to combine McCarty and Yamashita is different from that of the claimed invention, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Applicant argues that the rhodium surface area recited in catalyst claim 90 is not suggested by the prior art.

However, the prior art teaches a substantially weight distribution of the claimed catalyst on a substantially similar support as that of the claimed invention such that the properties of said catalyst on support of the prior art would be substantially similar to those of the claimed invention.

Applicant argues that Kato does not offer any direction as to which of the many acceptable rare earth metals to be combined with La is likely to result in a support as successful as the lanthanum hexaaluminate of McCarty.

However, it appears that applicant is arguing that the list in Kato is too long or that Samarium is not distinguished from the rest of the elements. Kato discloses those elements in the support and it would be obvious to one of ordinary skill in the art to use any of those metals in McCarty et al. The list is not unduly long or confusing as to leave



one of ordinary skill in doubt as to the applicability of any of those materials being combined with McCarty et al.

Applicant argues that Kato fails to provide the missing limitation of providing the combination of alpha-alumina, a rare earth aluminate, and a rare earth aluminate perovskite in the common support.

However, Kato is not relied upon to teach the limitation of providing the combination of alpha-alumina, a rare earth aluminate, and a rare earth aluminate perovskite in the common support. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

Pursuant to the remand under 37 CFR 41.50(a)(1) by the Board of Patent Appeals and Interferences on 2/27/08 **for further consideration of a rejection**, a supplemental Examiner's Answer under 37 CFR 41.50(a)(2) is set forth below: The rejection of claim 40 under 35 USC 112 has been removed as this rejection is not overcome by the amendments filed on January 29, 2007.

The appellant must within **TWO MONTHS** from the date of the supplemental examiner's answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the rejection for which the Board has remanded the proceeding:

(1) **Reopen prosecution.** Request that prosecution be reopened before the examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit, or other evidence. Any amendment, affidavit, or other evidence must be relevant to the issues set forth in the remand or raised in the supplemental examiner's answer. Any request that prosecution be reopened will be treated as a request to withdraw the appeal. See 37 CFR 41.50(a)(2)(i).

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. If such a reply brief is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened under 37 CFR 41.50(a)(2)(i). See 37 CFR 41.50(a)(2)(ii).

Extensions of time under 37 CFR 1.136(a) are not applicable to the **TWO MONTH** time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

**A Technology Center Director or designee has approved this supplemental examiner's answer by signing below:**

Gregory Mills

Supervisory Patent Examiner, Art Unit 1700

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Paul Wartalowicz/

Conferees:

/Stanley Silverman/

Supervisory Patent Examiner, AU 1793

/Gregory Mills/

Supervisory Patent Examiner, Art Unit 1700